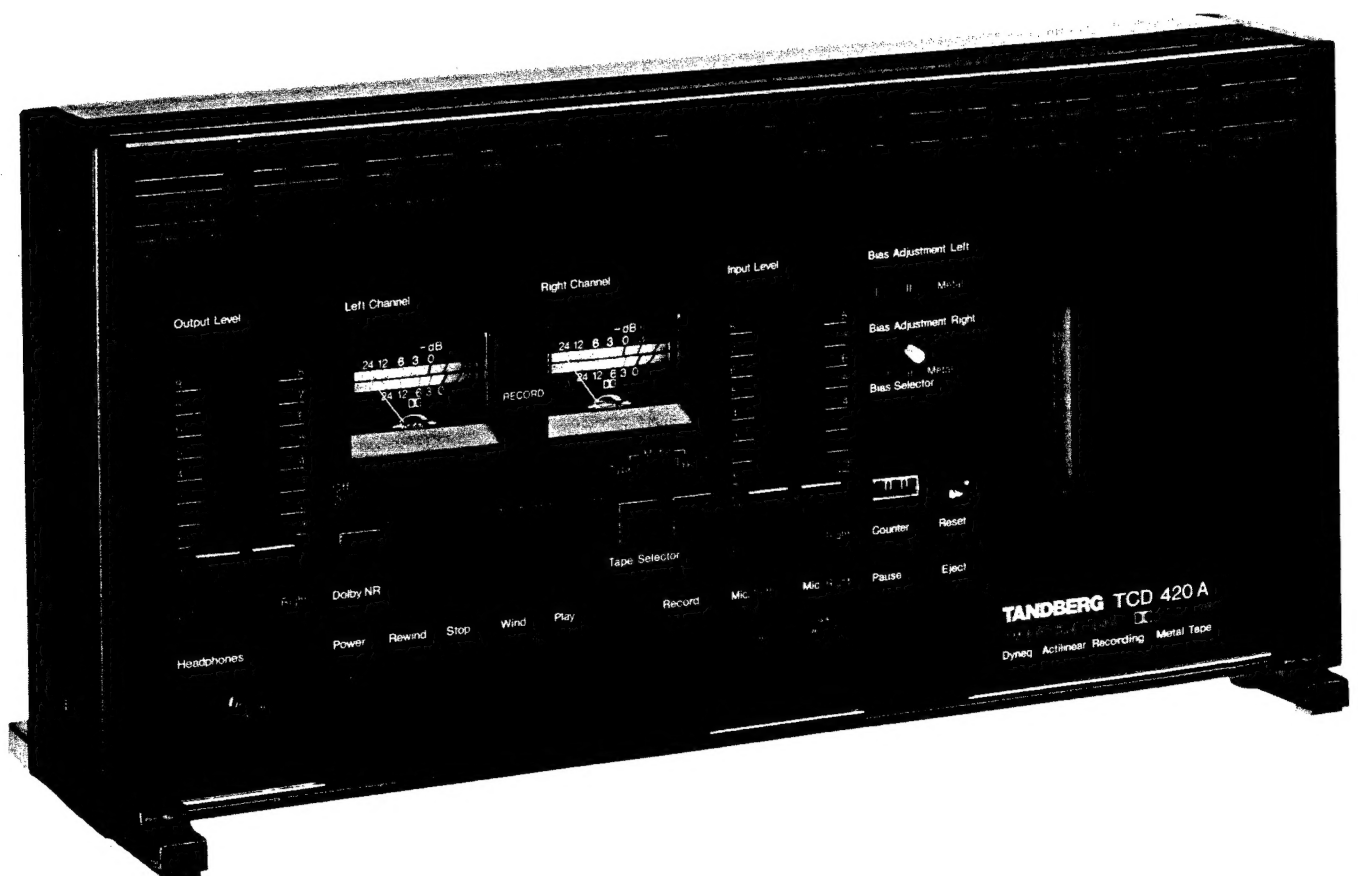


TANDBERG®

TCD 420 A

Circuit Diagrams with Alignment Instructions



TANDBERG® — The European Alternative

Electrical checks and adjustments

General

- 0 dB level is defined as:
 - 0.775 V in the RADIO socket, using Type I or II tapes.
 - 1.2 V in the RADIO socket using Metal tape.
 - 1.5 V in the OUTPUT sockets using Type I or II tapes.
 - 2.3 V in the OUTPUT sockets using Metal tape.
- Before adjusting, the tape path must be cleaned and demagnetized. It is necessary that the tape path is correctly adjusted.
- Carry out the adjustments in the order described because the adjustments affect each other.
- Remove the base panel.
- When adjusting the Bias-traps and the Bias-pre-adjustment, the top panel must be removed.

Equipment required

- 2 millivoltmeters
- Audio signal generator
- Frequency counter
- Distortion meter
- Wow and flutter meter
- Tandberg test cassettes:
 - No. 21 (Speed check, 1000 Hz)
 - No. 22 (Wow and flutter check, 3150 Hz)
 - No. 23 (Azimuth adj. playb. head, 6300 Hz)
 - No. 24 (Playback level adj., 1000 Hz)
- Measuring cassettes:
 - Maxell UD XL I (Type I)
 - Maxell UD XL II (Type II)
 - Fuji Metal or TDK Metal MA (Metal)

Before adjusting, set buttons to:

- MPX-FILTER (situated at the back of the deck) to OFF.
- Dolby NR.* to Off.
- Output Level controls to maximum.

* The words "Dolby" is registered trade mark of Dolby Laboratories Inc., US. NR stands for Noise Reduction.

Before adjusting, fold out page 5.

Oscillator

The oscillator frequency is between 80 and 100 kHz. The voltage measured on the erase head should be between 6 and 8 volts with Type II or Metal cassettes.

Bias traps

- Remove the top panel.
- Measure with a millivoltmeter on C107 and C207 and adjust L101 and L201 to minimum reading on the millivoltmeter.

Record/Playback head – azimuth

- Insert a Tandberg test cassette No. 23 or a standard azimuth cassette.
- Set the Monitor button to Tape and connect a millivoltmeter to each channel of the OUTPUT sockets.
- Press the Play button. Adjust the playback azimuth screw shown in the figure to obtain maximum reading on each channel.

Playback level

- Insert Tandberg test cassette No. 24 (Playback level adjustment 1000 Hz).
- Adjust with the PLAYBACK LEVEL ADJ. R317/R417 to 1.5 V on the OUTPUT sockets. (In the RADIO socket, adjust to 775 mV.)
- If you use a Dolby level cassette, adjust to 1.2 V on the OUTPUT sockets (0.615 mV in the RADIO socket).

Bias (pre-adjustment)

- Set the TCD 420A to record, Metal tape loaded.
- Adjust with R2103/R2203 (Bias Adjustment Metal) to approximately 8 – 9 mV measured on TP1 and TP2 (on the Osc. board), see figure.

NOTE! Adjusting the TCD 420A, using the RADIO-socket.

Overall frequency response with Metal tape

Set the TCD 420A to recording. Adjust the generator to -30 dB (= 25 mV on the millivoltmeters) and record a 400 Hz, a 10 kHz, and a 15 kHz signal at this level.

- Rewind and play back.
- Use the 400 Hz signal as a reference and check on both channels that the 10 kHz and 15 kHz signals are within the following tolerance: ± 3 dB.

If outside the tolerance adjust R2103/R2203 BIAS ADJ. METAL. Then make a new recording, play back and check once more.

- If you can not adjust to correct response with R2103/R2203, BIAS ADJ. METAL, then adjust R501/R601, TREBLE ADJ. METAL.
- Make a new recording, play back and check once more.
- Then check the frequency response ± 3 dB, 30 – 18000 Hz.
- When the frequency response is correct, check the response with the Dolby NR. circuit "On".

Recording Level — Metal tape

Connect an audio-generator and two millivoltmeters to the RADIO-socket. Set the TCD 420A to Record, use Metal tape. Adjust the generator to 400 Hz (= 450 mV on the millivoltmeters).

- Start recording.
- Rewind and play back (Output Level controls to maximum).
- The millivoltmeters should now read approximately 450 mV (-2 to 0 dB).

If outside the tolerance, make a new recording while adjusting R105/R205, REC. LEVEL METAL as required. Then play back and check once more.

Distortion — Metal tape

- Set the TCD 420A to recording.
- Generator to 1000 Hz (= 775 mV on the millivoltmeters).
- Rewind and play back.
- Check that the distortion is $\leq 3\%$.
- If outside the tolerance, adjust R2103/R2203, BIAS ADJ. METAL.
- Make a new recording, play back and check once more.
- Then check that the frequency response is within the tolerance.

Signal/noise — Metal tape

The signal/noise ratios at 3% distortion should be at least as good as specified. Measure with the Dolby NR. circuit "On".

| | |
|----------------|-------|
| IEC A-curve | 68 dB |
| IEC Linear RMS | 56 dB |

Program meters — Metal tape

- Set the TCD 420A to Record.
- Record a 400 Hz signal from the generator (= 1.2 V on the millivoltmeters) and adjust the program meters to 0 dB deflection on the Metal scale with R135/R235, METER LEVEL ADJ. RECORD.

Adjustments for type I tape

Recording Level

- Use the same level as for Metal tape (= 450 V on the millivoltmeter).
- Record, rewind and play back.

If outside the tolerance (– 2 to 0 dB), adjust R529/R629, REC. LEVEL I. Do not touch R105/R205, REC. LEVEL METAL.

- Make a new recording, play back and check once more.

Overall frequency response

- Use the same level as for Metal tape (= 25 mV on the millivoltmeters).

If outside the tolerance, ± 3 dB, 30 – 18000 Hz, adjust R2101/R2201, BIAS ADJ. I.

- Then check the frequency response with the Dolby NR. circuit “On”.

Distortion

- Record 1000 Hz at 0 dB (= 775 mV on the millivoltmeters).
- Rewind and play back.
- Check that the distortion is $\leq 2\%$.

If outside the tolerance, adjust R529/R629, REC. LEVEL I and R2102/R2202, BIAS ADJ. I.

- Then check the frequency response and the distortion once more.

Adjustment for type II tape

Recording Level

- Use the same level as for Metal tape (= 450 mV on the millivoltmeters).
- Record, rewind and play back.

If outside the tolerance, – 2 to 0 dB, adjust R104/R204, REC. LEVEL II.

- Make a new recording, play back and check once more.

Overall frequency response

Use the same level as for Metal tape (= 25 mV on the millivoltmeters).

If outside the tolerance, ± 3 dB, 30 – 18000 Hz, adjust R2102/R2202, BIAS ADJ. II.

- Then check the frequency response with the Dolby NR. circuit “On”.

Distortion

- Record 1000 Hz at 0 dB (= 775 mV on the millivoltmeters).
- Rewind and play back.
- Check that the distortion is $\leq 2\%$.

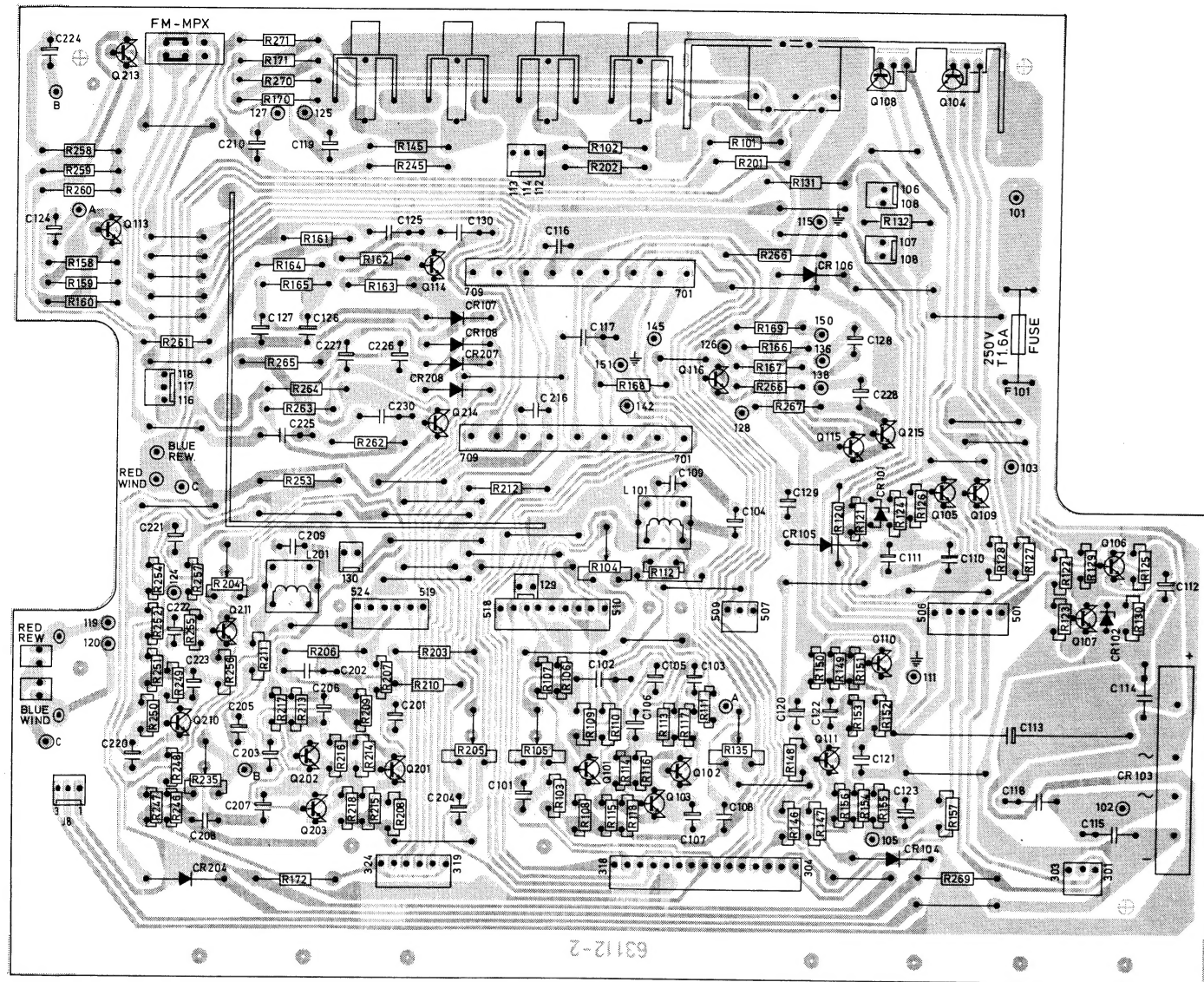
If outside the tolerance, adjust R104/R204, REC. LEVEL II and R2102/R2202 BIAS ADJ. II.

- Then check the frequency response and the distortion once more.

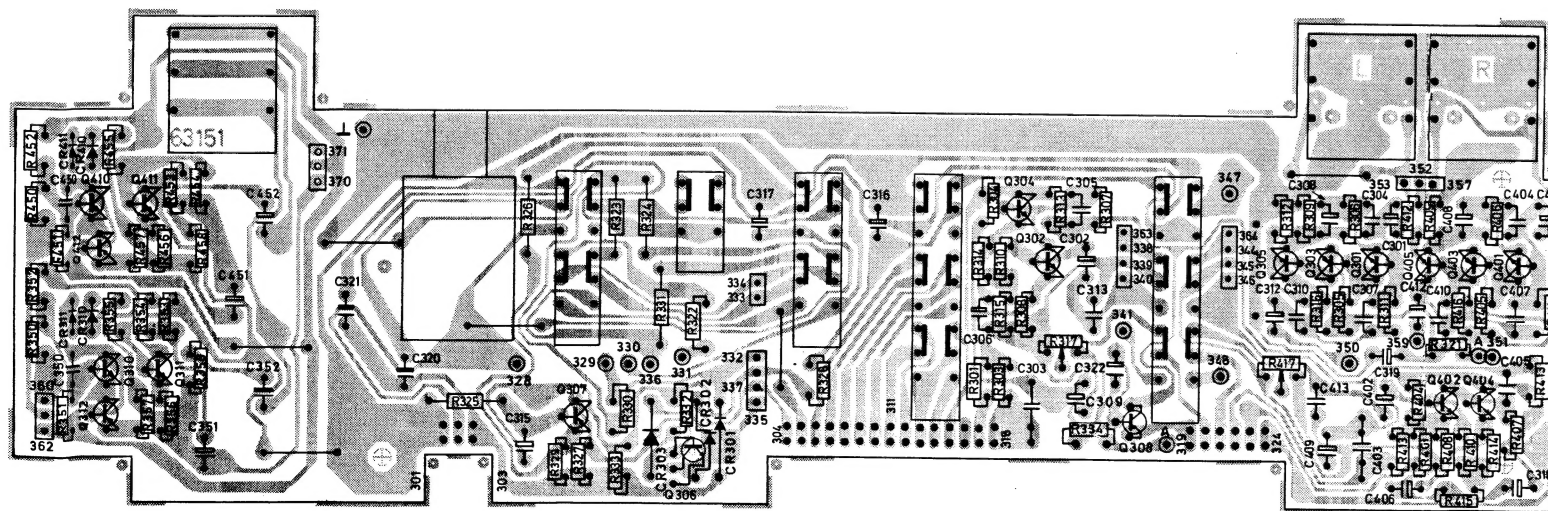
Speed check

Play back Tandberg test cassette No. 21 (Speed check 1000 Hz) and measure with a frequency counter on the output: $\pm 1\%$ (990 – 1010 on the counter).

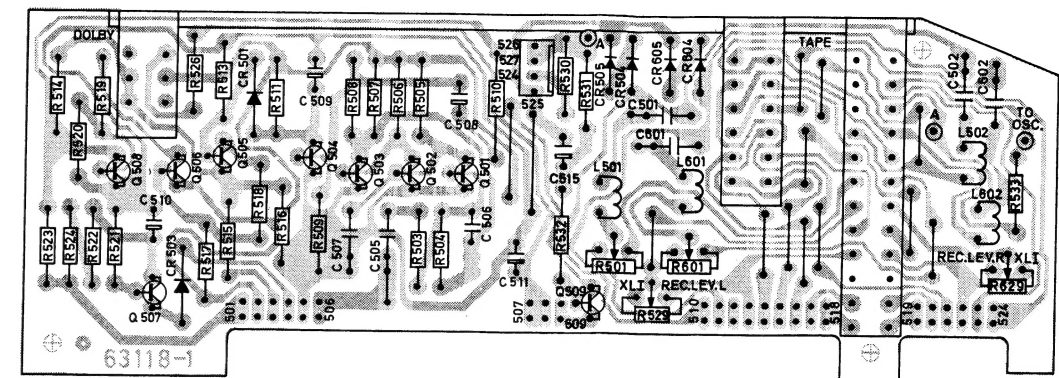
If necessary, adjust to correct speed with R208, SPEED ADJ. on the Motor control board.



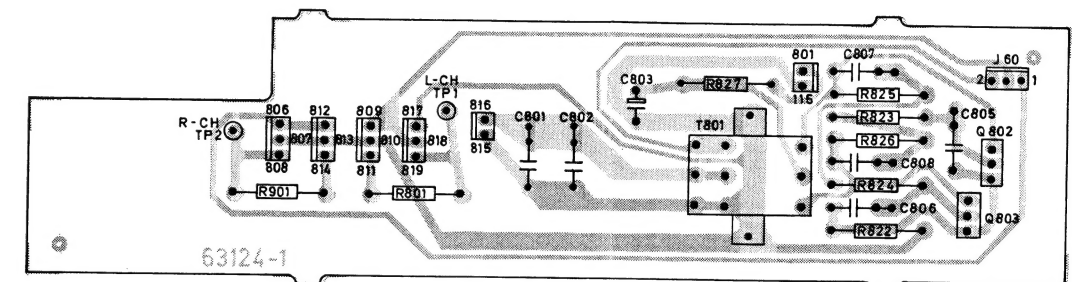
MAIN



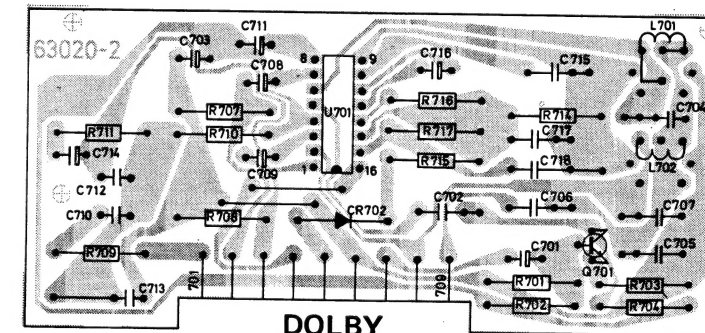
MIC./LINE, PLAYBACK, AND OUTPUT AMP.



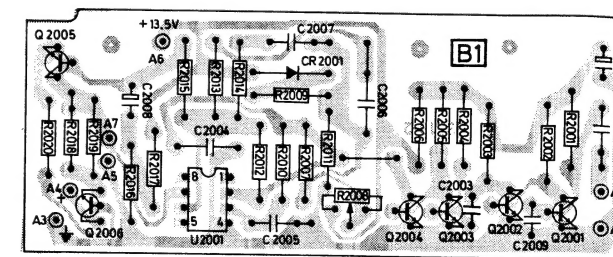
MOTOR SIGNAL AMP. AND DOLBY/TAPE SELECTORS



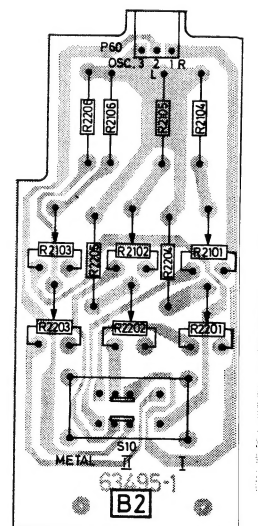
OSCILLATOR



DOLBY

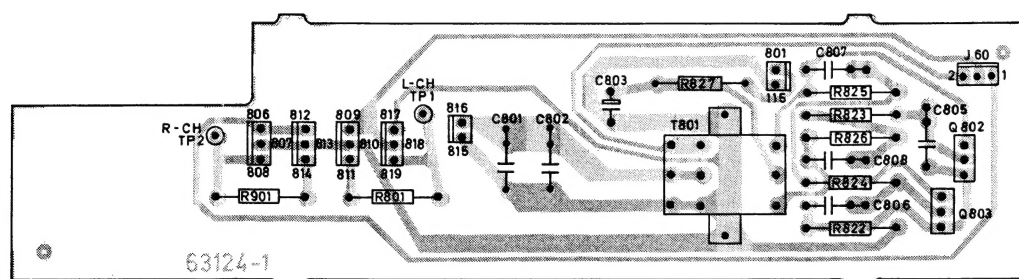
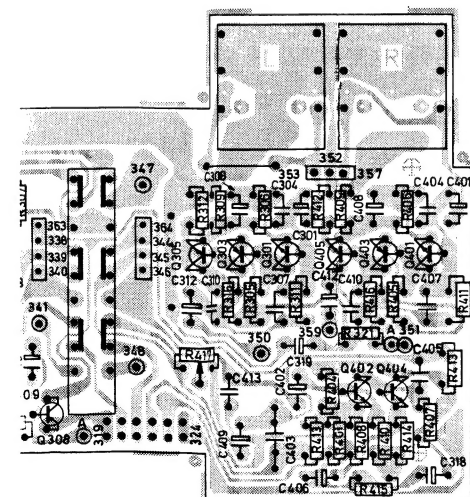


MOTOR CONTROL, CAPSTAN



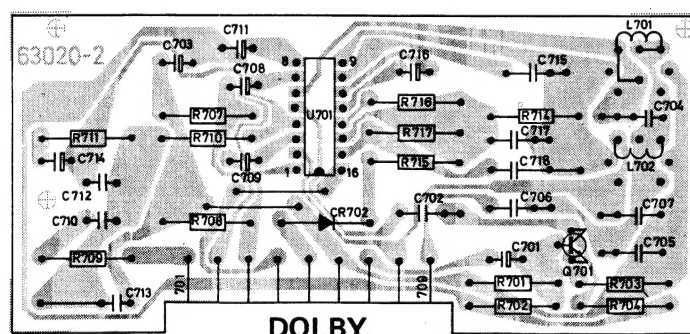
BIAS

ALL THE BOARDS ARE SEEN FROM THE SOLDER SIDE

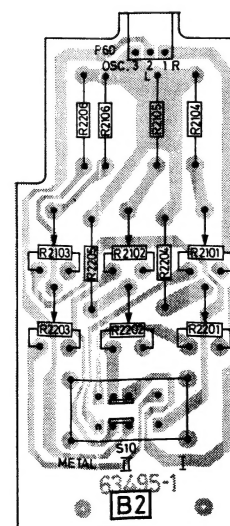


MOTOR SIGNAL AMP. AND DOLBY/TAPE SELECTORS

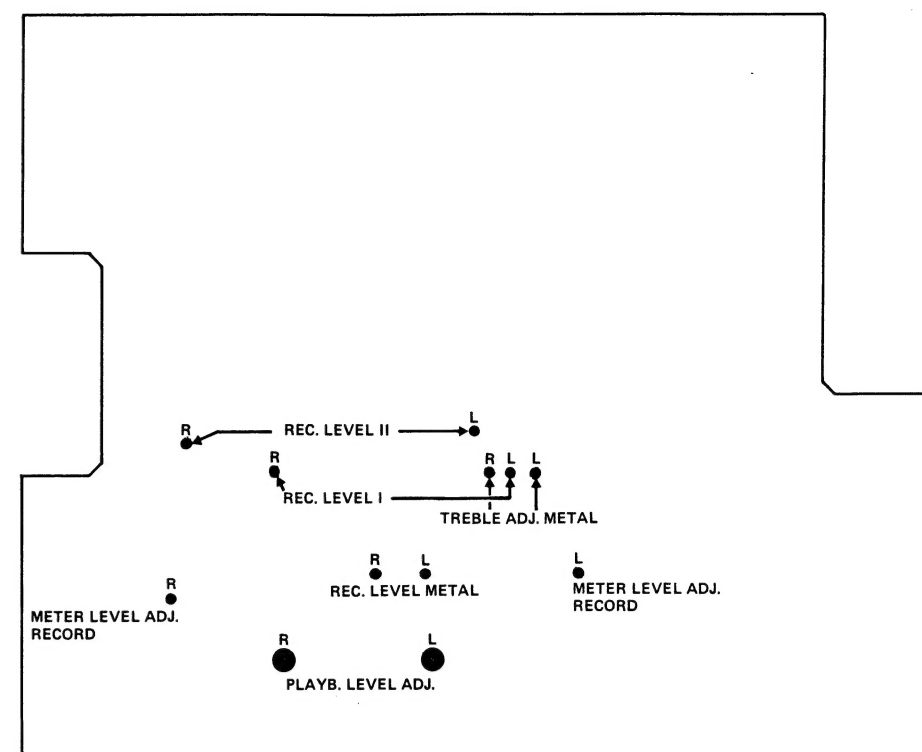
OSCILLATOR



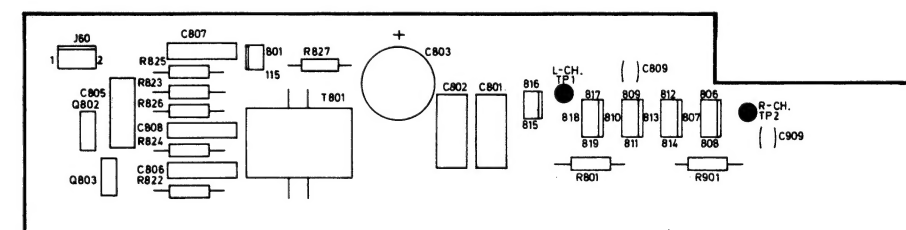
MOTOR CONTROL, CAPSTAN



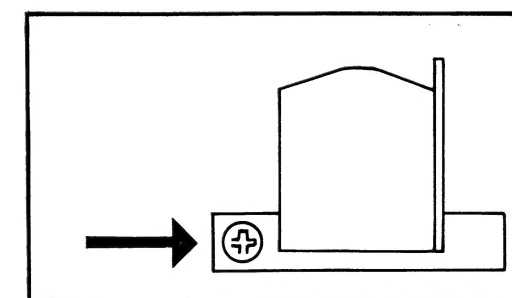
BIAS



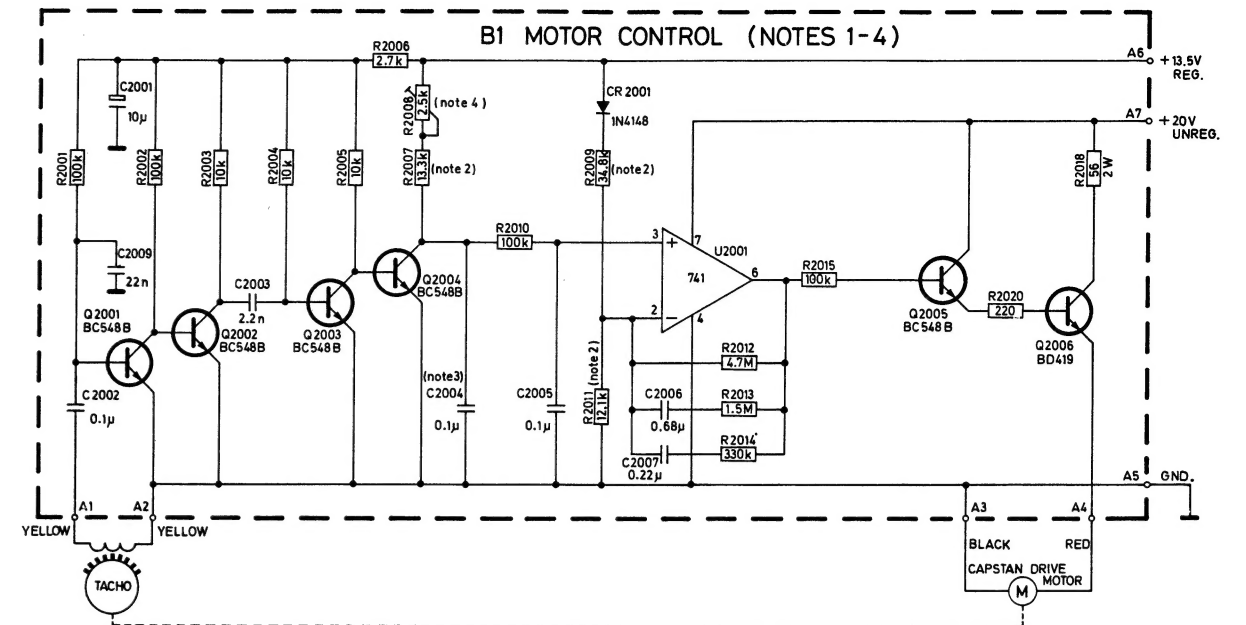
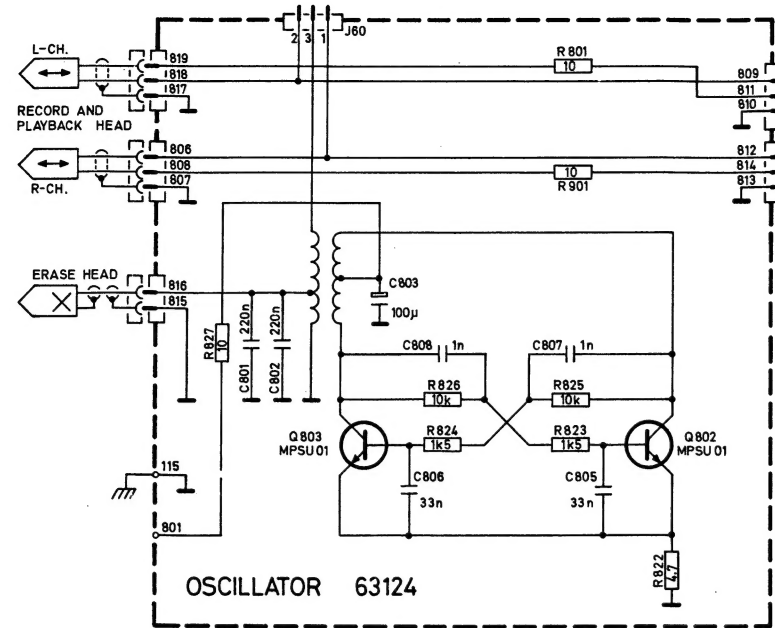
Trimming pots. on the Main board, seen from the solder side



Oscillator measurement points, seen from the component side



Azimuth screw on the record/playback head



- NOTES:**
1. UNLESS OTHERWISE SPECIFIED RESISTANCE IN OHMS.
 2. R2007, R2009 AND R2011 ARE 1% METAL FILM RESISTORS.
 3. C2004 = 0.1µ 5% POLYKARBONAT.
 4. R2008 = THICK FILM VARIABLE RESISTOR.

